Molossus rufus (Black Mastiff Bat)

Family: Molossidae (Free-tailed Bats)
Order: Chiroptera (Bats)
Class: Mammalia (Mammals)

Fig. 1. Black mastiff bat, *Molossus rufus*.

[http://www.tumblr.com/tagged/black-mastiff-bat, downloaded 9 November 2012]

TRAITS. This species is one of the largest bats found in Central and South America. *Molossus rufus* are noted for their distinctively relatively very large ears that extend outwards over the animals nose (Fig. 3). *Molossus rufus* gets the name mastiff bat from reference to the dog-like jowls of this group of bats. Like all other bats their bodies are covered 75% in fur and possess elongated fingers with wing membrane stretched between their fingers. The wings of a bat anatomically resemble the hands of a human being. *Molossus rufus* can have a wingspan of over 56 cm and will grow up to about 14-19 cm in length (Burt & Grossenheider, 1903). The body mass of this species can range from 60-70 grams. The black mastiff bat has dark brown to black fur. The dog-like jaw contains thirty teeth. They are also known for having a naked tail (Fig. 2). It is estimated that their life span stretches to 10-15 years in the wild.

ECOLOGY. *Molossus rufus* can be found throughout Central and South America and the Caribbean including Trinidad and Tobago (Simmons 2005). Roosts are the areas where bats "nest" or live (Fig. 5). Roosts can be found in dark places like rock fissures in high cliff faces, caves and even in the roofs and cracks of buildings. The bats are hardly ever seen outside the roosts. *Molossus rufus* have also been found to form roosts in tropical forests, evergreens, oak

forest and secondary vegetation (Santos & Castro-Arellano, 2005). The ideal habitat for the black mastiff bat must have large open areas with roost sites having vertical faces. The bat roosts in small colonies. Their large size contributes to the roost size. They need approximately twenty feet of vertical drop from their roosts so that they can gain enough speed for flight. If the bat does not have enough space to take off they end up on the ground.

SOCIAL ORGANIZATION. A study carried out in Rio de Janeiro state, Brazil, showed that colonies of the *Molossus rufus* may exceed more than five hundred, inclusive of males and females (Esberard 2002). As the mating season begins, the numbers of males in the colony at one time is observed to be higher than other times of the year when the females are seen to prevail. Pregnant females were identified between the months of September and February. Females that were lactating were identified in the months of August to February while active males were seen year round with an increase of males with abdominal testes only in the month of July (Esberard 2002). There is no evidence to support that in a given colony a specific leader or alpha male black mastiff bat is present as compared to colonies of some other species. Offspring typically are cared for in small maternity groups, where the females congregate to bear and raise the young. The male bats do not take an active part in raising the pups.

ACTIVITY. *Molossus rufus* is nocturnal in nature. This means the bat operates mostly at night. Like other types of bat the black mastiff bat spends the majority of the day inside their roosts. Daytime activity is limited to sleep and moving about in the roost. The mastiff bats sleep for the majority of the time. Movements in the roost vary from subtle head and wing movements to walking along the floor and sides of the roost. *Molossus rufus* has to walk and climb up the walls in order gain enough height to glide into flight. From sun down the bats begin to leave the roots to hunt for food and water. They may fly up to 250 miles in one night but commonly they only fly six miles away or as little as half a mile from the roost. They fly over masses of water to either drink the water or eat the insects on and above the water (Dolan, 1989). The black mastiff bats, unlike other bats in the northern hemisphere, do not migrate or hibernate. *Molossus rufus* stays active year round.

FEEDING BEHAVIOUR. *Molossus rufus* bats are insectivorous and would feed on any night-flying insect. A common place to find the insects is over bodies of water. The black mastiff bat can eat up to a couple of hundred insects in one night. The bat however can only eat up to one third its body mass to be able to stay light enough to fly (Santos & Castro-Arellano, 2005). The insects generally fly quickly and are not always able to turn and twist away from the bats. Like most bats the *Molossus rufus* uses echolocation to “see” and track the prey’s location and movements. Also like other insectivorous bats they eat their prey as they fly (Simmons, 2005). *Molossus rufus* also uses another technique to eating prey; when flying the bat scoops up the insects in its wings and takes it back to roost to eat (Johnson, 1985). Food is also shared among the pups and those that were least successful in finding food. This kind of behaviour is also seen among vampire bats (Santos & Castro-Arellano, 2005).

COMMUNICATION. Bats rely on echolocation or sonar to detect objects their environment at night. The process by which sounds emitted from the bat at high frequencies are used to create echoes. The echoes bounce off the objects around the bat and the information is interpreted by the bat. The bat is able to interpret distance, shape and possibly density of the objects. *Molossus rufus* like other bats utilize echolocation for their survival. Echolocation aids in food hunting, locating predators and even flight navigation. The insects that the bats hunt also produce sounds as well as vibrations from the insect wings that the bats can detect (Dolan, 1989). *Molossus rufus* communicate with each other by emitting high pitched sounds and screeches that humans cannot hear with the naked ear. The bats ears are tuned to a very specific frequency and the sounds that the bat makes are slightly outside of the range that they hear (Simmons, 2005). This ensures that the bat does not deafen itself. For mating; males produced a sound that is long and soothing to the female bat. This sound has been found to be very similar to that of the black mastiff bat pup. The sound attracts the female to the male. The males intercommunicate with more aggressive sounds and are mostly noted when marking territories. Likewise the females intercommunicate in a particular way (Simmons, 2005).

SEXUAL BEHAVIOUR. The sexual conduct of *Molossus rufus* is typical of that of other species of bats in that there is one mating season that coincides with high supply of food. Mating mainly takes place in spring, which is to say between April and early June. The male mastiff bats have a dermal or skin glad that becomes enlarged during mating season. This glad produces a strong odour that attracts the female mastiff bat. The males also produce a mating call (Simmons, 2005); this mating call made by the males is very attractive to the females and is close to the sound that the infant *Molossus rufus* makes. The ability to reproduce is highly limited in *Molossus rufus* and other bats because of the need to maintain a weight manageable for flight (Simmoms, 2005). Mating is done within the safety of the roost and is performed upside down (Fig. 4). For their size, *Molossus rufus* and bats generally are the slowest reproducing mammals (Barquez et al., 2008). They give birth generally to one pup and on rare occasions two pups are born. The pup weighs about 25 % of the mother's total body mass. The offspring are then typically cared for maternally by all the females in the nursing colonies (Santos & Castro-Arellano, 2005).

JUVENILE BEHAVIOUR. For the *Molossus rufus*, the pups are born not being able to see. For the first few days the mother carries the pup. The pups are taken care of by the females and are kept safe in nurseries inside the roosts. After seven days the eyes are opened. At three weeks the pup is now also able to fly on its own. At four months the pup leaves the parent and forms part of a new colony. It reaches sexual maturity at 9 months and is ready for mating (Esberard 2002).

ANTIPREDATOR BEHAVIOUR. Typical predators of the black mastiff bat include birds such as owls, falcons and hawks. To avoid predators the bat would fly at night as mentioned before. They live in relatively large groups so that they can warn each other of the danger of a predator (Esberard 2002).

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Author: Atiba Borde

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Fig. 2. Black mastiff bat, *Molossus rufus*, showing dark fur and naked tail.

[http://www.google.tt/imgres?imgurl=http://attila.inbio.ac.cr:7777/pls/portal30//IMAGEDB.GET_BFILE_IMAGE, downloaded 9 November 2012]

Fig.3. Head of black mastiff bat, *Molossus rufus.*

[http://www.studydroid.com/index.php?page=viewPack&packId=165240, downloaded 9 November 2012]

Fig. 4. Black mastiff bats mating.

[http://news.discovery.com/animals/pictures-animal-sex-mate-strange-bizarre-ritual-120213.html, downloaded 9 November 2012]

Fig. 5. Example of a bat roost.

[http://ecotime.blogspot.com/2009_11_01_archive.html, downloaded 9 November 2012]