



## Case Report/Relato de Caso

# Rabies virus in *Molossus molossus* (Chiroptera: Molossidae) in the State of Pernambuco, Northeastern Brazil

Vírus rábico em *Molossus molossus* (Chiroptera: Molossidae), no Estado de Pernambuco, nordeste do Brasil

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### RESUMO

Isolamento do vírus rábico em morcegos (*Molossus molossus*) em área urbana, no município de Recife, Pernambuco, Brasil. Quatro exemplares foram encontrados durante o dia em locais visíveis e não habituais caídos no chão ainda com vida, não havendo contato com pessoas ou animais. Destes apenas dois foram identificados; porém, não foi possível fazer a identificação em dois espécimes, pois os mesmos foram incinerados antes da identificação. O diagnóstico foi positivo para as provas de imunofluorescência direta e inoculação intracerebral em camundongos. O presente estudo apresenta o isolamento de vírus rábico pela primeira vez no Estado de Pernambuco em morcegos insetívoros.

**Palavras-chaves:** Epidemiologia. Quirópteros. Raiva. Saúde pública.

### ABSTRACT

Rabies virus was detected in bats (*Molossus molossus*) from an urban area in the City of Recife, State of Pernambuco, Brazil. Four individuals were found during the day in visible, non-habitual places, lying on the ground, but still alive. No contact occurred with people or animals. Of these, only two were identified; it was not possible to identify two specimens, since they were incinerated prior to identification. Diagnosis was positive by direct immunofluorescence and intracerebral inoculation in mice. This study presents the first instance in which the virus was detected in insectivorous bats in the State of Pernambuco.

**Keywords:** Epidemiology. Bats. Rabies. Public health.

## INTRODUCTION

Rabies is a disease normally maintained and perpetuated in nature by wild mammals, including carnivores, primates and bats. Control of rabies is now efficient among urban pets (dogs and cats) and, in the rural area, in animals of economic interest, wild and synanthropic animals assumed to have an extremely important role as natural reservoirs of rabies virus<sup>1</sup>. Bats remain in first place regarding the rate of transmission to humans in Brazil and of these, insectivorous bats are becoming increasingly important in the epidemiology of the disease<sup>2</sup>.

Among bats that use human buildings for shelter, the insectivorous type (Molossidae) stand out, as these form colonies containing tens, hundreds or sometimes even thousands of individuals. Within this group, in Brazil, *Molossus molossus* is the most common and geographically widespread species<sup>3</sup>. Reports of rabies in this species have been registered<sup>4,5</sup>; however, no reference to the State of Pernambuco has been made concerning rabies in insectivorous bats, making this the first notification.

## CASE REPORT

The specimens (Table 1) were found in the courtyard of the National Agricultural Laboratory (*Laboratório Nacional Agropecuário, LANAGRO*) in Pernambuco (PE), in the district of *Dois Irmãos*, in the metropolitan area of Recife, in the Northwestern region of the city. In the surrounding area, the Federal Rural University of Pernambuco, the Zoobotanical Park of *Dois Irmãos*, within an urban fragment of Atlantic rainforest with an area of approximately 388ha, the national highway BR-101, and several residential areas are located. The samples analyzed were identified, following criteria established by an artificial identification key<sup>6</sup> using morphological and morphometric characteristics, as *Molossus molossus*, an insectivorous bat of the Family Molossidae.

*Molossus molossus* is the most widely distributed Molossidae in Brazil and one of the most sampled in surveys, both in rural and urban environments. Generally, it lives in hollow trees, under palm leaves, inside the roofs of houses with wooden ceilings, between slabs, tiles and expansion gaps in buildings. The species is highly adapted to the conditions of shelter and food imposed by cities.

At first, the brain tissue samples were analyzed by direct immunofluorescence for rabies, presenting positive results. Later, brain samples were inoculated in mice (biological test) following the method described by Meslin *et al*<sup>7</sup> involving intracerebral inoculation of a suspension of brain material extracted from each bat in twelve 21-day-old mice.

No contact occurred between infected bats and people or other animals and preventive measures were put into effect to avoid contamination from other affected bats. Management guidelines were passed on to employees and included avoiding manipulation of bats lying on the ground or in suspicious activity, while competent government bodies were called into action to locate and manage the colonies and promote vaccination of domestic animals and awareness of local communities.

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TABLE 1 - Description of insectivorous bats testing positive for rabies captured during 2009 in Recife, State of Pernambuco.

| Species                  | Date of capture | Observation  |
|--------------------------|-----------------|--|
| <i>Molossus molossus</i> | January 29      | Adult female, reproductive inactivity; found lying on the ground in the parking lot of LANAGRO-PE, at 11:30 AM; the bat was aggressive and tried to bite the collector.              |
| <i>Molossus molossus</i> | February 5      | Adult female, reproductively inactive, was observed flying during the morning inside the premises of LANAGRO-PE. Later it was captured while lying on the ground in the parking lot. |
| Unidentified*            | March 25        | Both were found on the ground in the parking lot, close to the location of the previous records.   |
| Unidentified*            | April 17        |  |

LANAGRO-PE: *Laboratório Nacional Agropecuário de Pernambuco*. \*It was not possible to identify these specimens, since they were incinerated prior to identification.

## DISCUSSION

The association between *Molossus molossus* and the rabies virus does not appear frequently in the literature and the first report from Brazil dates from the 1970s<sup>5</sup>. The present paper is the first report of this species with the rabies virus in the State of Pernambuco. Similar to the present report, the capture of rabies positive nonhematophagous bats was the result of finding an specimen in atypical condition<sup>2,4,5</sup>, though other circumstances have been described.

Reports of rabies positive bats are isolated and sporadic, not necessarily related to a time of year or specific place of occurrence<sup>4,8</sup>. The present cases occurred in locations very close to each other and within a short period of time, suggesting the specimens belonged to the same colony. A further seven unidentified individuals were collected in the parking lot of LANAGRO-PE, two of which were positive; it is likely that they were the same species. A rabies outbreak in a colony of *Tadarida brasiliensis* described five cases within 30 days<sup>9</sup>. The authors associated this event to the stress suffered by the colony after DDT application as a control measure, two weeks before the first reported case, which probably lowered the immunity of the bats. No control measures were confirmed in the colonies of bats in the premises of LANAGRO-PE, thus discarding stress due to chemical control.

In Pernambuco, the low number of samples of bats sent for viral analysis, especially of nonhematophagous species, may be masking the occurrence of the virus in this group of mammals. The separation of bats in two groups, hematophagous and nonhematophagous, without proper identification of the species, has hindered the review and analysis of official data, thereby undermining current knowledge of the species role in the epidemiology of rabies, since, by organizing the data in this manner, different species are grouped in the same set. Correct species identification is essential because each species has unique biological characteristics that are important for the preliminary assessment of the situation<sup>4,10</sup>.

Detection of rabies virus in *Molossus molossus* in a residential neighborhood shows the movement of this pathogen in the urban ecosystem, independent of the occurrence of rabies cases in humans and domestic animals (dogs and cats). This represents an important concern for public health, because it is a synanthropic species often found sheltering in inhabited houses, thus enabling contact with humans and domestic animals and eventual transmission of the virus.

Preventive measures are suggested by the authors, mainly regarding the submission of samples for viral analysis and research of the situation of rabies in properly identified nonhematophagous bats in other regions of the state. The development of training of personnel for the management of synanthropic bats is of fundamental importance, together with environmental education activities, in order to raise awareness concerning the importance and care that must be taken with urban bats.

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