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RABIES VIRUS MONITORING IN BATS FROM THE DIRECT AREA OF INFLUENCE OF HYDROELECTRIC POWER PLANT IN JIRAU, RONDÔNIA, BRAZIL

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In Rondônia State, North region of Brazil is being built at Madeira River, the hydroelectric power plant of Jirau. The implementation of huge enterprises such as the hydroeletric demands a series of alterations in the environment, such as vegetation suppression and movement of land in large extension along with other antropic activities of high environmental impact. These activities can destroy the artificial and natural shelters for bats. Several studies have pointed an association between these environmental changes and outbreaks of rabies. Monitoring Jirau´s bat population began in 2010 and it was made over a period of three years, with regular visits lasting 10 to 12 days, twice a year, totalizing six campaigns. First, the local population was interviewed aiming at eliciting what they knew about rabies and bats and to locate the shelters of these animals. In the period of three years, 158 people were interviewed, 4.387 bats were captured by mist net or active search and 3.852 of them were loose after this proceeding. Regarding to rabies, 535 bats and 486 sera were sent for diagnosis and antibodies dosage respectively at CCZ-SP by Direct Fluorescence and Simplified Fluorescence Inhibition Microtest. All bats were negative to rabies. The global prevalence of antibodies was 15.4% using 0.5IU/ml as a cut-off (0% in the first campaign, 2.8%, 6.4%, 19.2%, 14.8% and 36.3% in the subsequent campaigns). In the interview 93.5% declared to know the disease, however rabies was associate to dogs and just 52.5% knew that bats could transmit rabies. Regarding the type of houses, 93.5% were vulnerable to bats presence and bats were roosting in 70% of these houses. The results for rabies antibodies dosage showed a progressive increase for every subsequent campaign. As the first campaign was performed before the demolition of the houses and vegetation suppression in the direct area of influence of the hydroelectric, these results could be reflecting the perturbation inflected to the population of bats such as the stress of the forced migration to search for new shelters and foraging areas as well as the disputes for space and food with the bats populations already established in the new shelters up to the moment when there is the reestablishing of the colonies. Considering just the presence of antibodies as indicative of the contact with the virus, the average of titers in the first and second campaigns was 0,03UI/ml and 0,04UI/ml while in subsequent campaigns this average was 0,21UI/ml, 0,49UI/ml, 0,24UI/ml and 0,38UI/ml, respectively. When statistically analyzed by Kruskal-Wallis ($H=1.611,942$; $p<0,0001$) and Dunn ($R1=44.330$) these tests confirmed that there is significant difference in the results observed among the campaigns and the difference observed between the results of first campaign and subsequent campaigns is significant. These data indicate the increase of rabies virus circulation among these bat populations and suggest a potential risk of rabies outbreak that should be monitored.

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DELIMITAÇÃO DE ÁREAS DE CONTROLE NO ESTADO DE SÃO PAULO PARA A RAIVA DOS HERBÍVOROS NAS REGIÕES DA SERRA DA MANTIQUEIRA E CANASTRA

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A progressão dos focos de raiva em herbívoros está associada às localizações dos abrigos de *Desmodus rotundus* que por sua vez, estão relacionados às principais feições geográficas de uma região. Muitos estudos consideraram elevadas altitudes, rios ou determinado tipo de cobertura da terra como fator protetor ou causal para difusão de epidemias. Geotecnologias foram utilizadas por Gomes et al (2011) para gerar um modelo descritivo com três camadas sobrepostas: a enfermidade caracterizada por uma função kernel dos focos de raiva entre 1992 e 2003, os tipos de uso e cobertura da terra obtidos por classificação de imagens de satélites e a altitude oriunda do radar SRTM. Segundo os autores, a enfermidade esteve fortemente moldada pelas áreas de vegetação rasteira (pastagens). O relevo formou os mosaicos de uso e cobertura da terra, o qual determinou os locais de grassamento ou não da enfermidade. Constataram-se regiões permeáveis de menores altitudes da Serra da Mantiqueira na divisa de estado com Minas Gerais que eram carreadores de casos, assim como, áreas delimitadas pela serra da Quebra Cangalha que divide horizontalmente o Vale do Paraíba. A análise temporal demonstrou que os focos tinham sentido do estado de Minas Gerais para o de São Paulo. Frente às constatações, a Coordenadoria de Defesa Agropecuária do estado de São Paulo (CDA) priorizou uma faixa na divisa estadual para realização de trabalhos de controle da enfermidade. Os locais relatados como carreadores também estão relacionados à introdução de novos casos. De certa forma, validando o primeiro modelo descritivo. Focos, agora identificados como pontos de coordenadas adquiridos por receptor de GPS entre os anos de 2008 e 2012, demonstram que o vale do rio Sapucaia e Sapucaia-Mirim proporcionam faixas de menores altitudes na Serra da Mantiqueira para introdução de raiva na Região de Bragança Paulista e São José dos Campos. A Serra da Mantiqueira, na região de Caconde e Cruzeiro, também possuem cortes de menores altitudes que possibilitam maior permeabilidade de focos. Por fim, na região da Serra da Canastra também ocorre tais formações de baixa altitude. Assim, estas análises descritivas sugerem que a CDA possa definir menores áreas de prioridade de controle da enfermidade, que delimitariam áreas específicas sentinelas e de controle de *Desmodus rotndus* nas faixas de menores altitudes nas serras aqui estudadas. Trabalhos conjuntos com e estado mineiro deveriam ser fomentados. Agradecimentos a Coordenadoria de Defesa Agropecuária e FAPESP projeto Nº 03- 12319-0 Gomes MN, Monteiro AMV, Escada MIS. Raiva bovina segundo os mosaicos de uso e cobertura da terra no estado de São Paulo entre 1992 e 2003. *Arq. Bras. Med. Vet. Zootec.*, v. 63, p. 287, 2011.

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APLICACIÓN DEL MANEJO INTEGRADO DE PLAGAS (M.I.P.) EN EL CONTROL DEL "DESMODUS ROTUNDUS" EN COSTA RICA

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Las pérdidas económicas en nuestra ganadería aumentan año con año por causa del Desmodus rotundus (murciélago hematófago) estimándose en $800.000.00 por año. La principal enfermedad que transmiten es la rabia paralítica bovina y la ecología de nuestro país hace propicia la multiplicación de este vector. De las 110 especies de murciélagos que existen en Costa Rica, solamente tres son hematófagas y generalmente los ganaderos no distinguen estás de las otras especies que tienen una gran importancia ecológica, por lo que eliminan ecosistemas enteros utilizando métodos equivocados en cuevas, troncos huecos y otros refugios, ya que por vivir en grupos numerosos son los animales más susceptibles a la extinción. El Programa Nacional de Rabia Paralitica Bovina del Ministerio de Agricultura y Ganadería lleva a cabo el control de este vector, tomando en cuenta el concepto de MIP (Manejo Integrado de

Plagas), el cual se concibe como un sistema de control que considera el medio ambiente en el que vive la plaga, su dinámica poblacional, previendo consecuencias ecológicas y económicas, seleccionando métodos de control para reducir las poblaciones por debajo del daño económico, de salud animal y salud pública. Por medio de una campaña de Educación Sanitaria que comprende mil quinientas charlas y demostraciones de métodos a más de quince mil ganaderos y estudiantes se ha logrado concientizar al productor ganadero para que no elimine las especie benéficas en sus fincas.

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SUSCEPTIBILITY OF *MYOTIS LUCIFUGUS* TO HETEROLOGOUS AND HOMOLOGOUS RABIES VIRUSES.

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Rabies virus (RV) maintenance in bats is not well understood. *Eptesicus fuscus, Myotis lucifugus, and Tadarida brasiliensis* are the most common bats species in the US. These colonial bat species also have the most frequent contact with humans and domestic animals. However, the *Lasionycteris noctivagans/Perimyotis subflavus* (*Ln/Ps*) RV is associated with the majority of human rabies virus infections in the United States and Canada. This is of interest because the *L. noctivagans* and *P. subflavus* bat species are more solitary bats with less frequent human interaction. Our interest was to determine the likelihood of a colonial bat species becoming infected with and transmitting a heterologous RV. To determine the potential of heterologous RV infection in colonial bat species, *M. lucifugus* bats were inoculated with a homologous or one of two heterologous (*E. fuscus* and *L. noctivagans*) RV. Additionally, to determine if the route of exposure influenced the disease process, bats were inoculated either intramuscularly (i.m.) or subcutaneously (s.c.) with a homologous or heterologous RV. Bats were observed for 6 months. Survivors were challenged i.m. with a homologous RV and observed for an additional 6 months. Our results demonstrate intramuscular inoculation results in a more rapid progression of disease onset as compared to a significantly longer incubation time in bats inoculated s.c. Additionally, cross protection was not consistently achieved in bats previously inoculated with a heterologous RV following a six month challenge with a homologous RV. Finally, bats that developed rabies following s.c. inoculation were significantly more likely to shed virus in their saliva and demonstrated increased viral tissue tropism. In summary, bats inoculated via the s.c. route are more likely to shed virus thus increasing the potential for transmission.

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CDC'S GLOBAL DISEASE DETECTION PROGRAM AND THE INTERNATIONAL HEALTH REGULATIONS: PROVIDING EARLY WARNING TO CDC FOR HUMAN RABIES OUTBREAKS

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In 2003, the spread of SARS alerted public health leaders that novel pathogens could be transmitted along international travel routes with unprecedented speed. With the realization that an outbreak anywhere in the world was a potential threat to virtually all countries, the United States Congress in 2004 authorized the appropriation of funds to establish a Global Disease Detection (GDD) program, based at the CDC, with the aim of promptly detecting and mitigating the consequences of emerging threats. The GDD program provides a platform to develop and strengthen global capacity to rapidly detect, identify, and contain emerging infectious disease and bioterrorist threats in line with the International Health Regulations (IHR), which entered into force in June 2007 and legally requires all signatory nations to establish systems to detect and respond to new disease threats. The GDD program was subsequently selected by WHO as a key partner to help implement the IHR (2005) for its 194 member states and in 2009 was designated a WHO Collaborating Center for Implementation of IHR National Surveillance and Response Capacity. A significant component of GDD is the GDD Operations Center (GDDOC), an epidemic intelligence unit which uses novel, event-based surveillance techniques to provide CDC programs with a single source of reliable, comprehensive, and high quality information on international disease outbreaks, and provides logistical and financial support to CDC programs for emergency deployments to international outbreaks. Technological advances have revolutionized the way information is accessed, and event-based surveillance provides a mechanism for the organized and rapid collection and verification of information about events that are a risk to public health, particularly with regard to emerging zoonoses, which countries sometimes cannot or do not report to the global public health community. A re-emerging, global zoonosis that the GDDOC actively monitors is rabies in both animals and humans. Since 2009, the GDDOC has supported provided epidemiologic, logistical, or financial support to CDC's Rabies Program for emergency deployments to the Dominican Republic, Peru, Ecuador, and Kenya to mitigate outbreaks of human rabies associated with canine and vampire bat rabies. Because of the GDDOC's work to actively identify and report rabies-related event-based surveillance data to CDC's Rabies Program, CDC is better positioned to respond to a request for technical assistance by the affected country and establish core capacities in compliance with IHR.

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RESULTS WEBSITE FOR RABIES DIAGNOSTIC CONSULTATION INTO THE HEALTH SERVICES OF COAHUILA, MEXICO.

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Background: Health Services of Coahuila had not a rabies diagnostic laboratory. It was needed to send samples to Nuevo Leon and InDRE to solve this limitation. On April, 2010, the State Authorities established this laboratory that is placed inside the facilities of the State Laboratory of Public Health. On July, 2010 the laboratory formalized operations with the InDRE. The laboratory has 2 employees: a professional diagnostics specialist and a laboratory technician. **Challenges**: Sample shipments for rabies virus monitoring to other states. Extemporary reception of other states results. No clear idea about rabies virus circulation and sanitary risk status in the State. Expensive operational costs. Several criteria of rabies PEP based on lab results. The laboratory had not a working algorithm for technical and epidemiological reports as well as for laboratory results. The lab had not a standard protocol to establish a timely diagnostic. **Alternatives of Solution:** To develop a feasibility study for the operation of a rabies diagnostic laboratory and to identify the mechanisms and support elements to establish this laboratory. Review the operative and financial plans and rabies vaccines availability for PEP. Website design for electronic consultation via Internet, to get the timely diagnostic according with the needs and request from the operative units. **Operation:** The Epidemiological surveillance of rabies in the State is