A Vaccinia bovina (VB), zoonose emergente, causada pelo *Vaccinia virus* (VACV) é caracterizada pelo surgimento de lesões ulceradas no teto das vacas em lactação e nas mãos e braços de ordenhadores. A partir da década de 1990, o número de casos de VB vem crescendo, sendo hoje identificados surtos em quase todos os estados brasileiros. A doença é subnotificada e as medidas de contenção necessárias para o seu controle são frequentemente desconhecidas, favorecendo a disseminação da doença. Os prejuízos econômicos relacionados à VB estão associados principalmente à queda brusca na produção do leite, presença de infecções secundárias e aumento dos gastos com medicamentos. Estudos prévios revelaram a presença tanto de DNA, quanto de partículas virais infecciosas do VACV, no leite de vacas doentes em surtos de VB em Minas Gerais, chamando a atenção para o potencial risco à saúde pública. Porém, permanecem desconhecidos o perfil de eliminação do vírus no leite de vacas acometidas e a origem das partículas virais presentes no leite. Este trabalho objetivou pesquisar a presença do DNA viral através da técnica de PCR, em leite de animais experimentalmente infectados, e de estabelecer o período e o perfil de eliminação do vírus no leite. Oito vacas mestiças em lactação, soronegativas para o VACV, foram inoculadas com VACV, amostra GP-2 (isolada de surto de VB ocorrido no município de Guarani, MG), na concentração de 106 PFU/50 µL.Os tetos foram escarificados com lixa, sendo que o teto posterior esquerdo (TPE) de cada vaca não foi inoculado, servindo de controle negativo. Amostras de leite foram coletadas durante 32 dias ininterruptos e alternados até o 60º dia, sendo os dias pares coletados com uma sonda estéril e os dias ímpares através de ordenha manual. Todas as amostras foram submetidas à PCR para o gene *vgf*. Entre o segundo e o quarto dia pós-infecção (DPI), todos os tetos, com exceção do TPE, apresentaram lesões típicas de VB que cicatrizaram em média após 21 dias. Foi possível detectar a presença de DNA viral no leite a partir do terceiro DPI e, de forma intermitente, até o sexagésimo dia. O leite derivado dos tetos inoculados do controle (TPE), de todas as oito vacas, apresentaram, em algum momento, DNA viral. Além disso, indiferentemente da forma de coleta (manual ou com sonda), foi possível detectar o DNA viral no leite. Esses resultados mostram que o vírus pode ser eliminado de forma intermitente no leite durante e após a fase aguda da doença, mesmo após a cicatrização total das lesões, sugerindo uma possível infecção sistêmica e persistente.

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Bovine vaccinia, a sistemic infection: evidence of fecal shedding, viremia and detection in lymphoid organs

Vaccínia bovina, uma infecção sistêmica: evidencia de eliminação nas fezes, viremia e detecção do vírus em órgãos linfóides

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Bovine vaccinia (BV) is an occupational zoonosis caused by Vaccinia virus (VACV), which affects dairy cattle and milkers. In bovine natural infections, it seems that BV is a localized disease, with cutaneous lesions restricted to the teats. However, there are no studies about experimental infection with VACV in bovines to establish its pathogenesis and elimination pathways. The aim of this study was to study the occurrence of viremia and elimination of VACV in bovine feces. Eight crossbred lactating cows, serologically negative for VACV, were used. Teats were previously scarified with sand paper and then inoculated with 106 pfu/100 µL of Guarani P2 (GP2) strain of VACV. Blood samples and feces were collected daily throughout the experiment. After 66 days post inoculation (d.p.i) the animals were divided into two groups that receive two new different treatments. One group was re-inoculated with the same inoculum and the other was subjected to chemical immunosuppression, to evaluate whether re-infected animals and/or experimentally infected animals that recover from previous lesions in conditions of immunosuppression could eliminate VACV on feces once more. Animals from both groups were monitored for up the 89th day post initial inoculation. Viral DNA was continuously detected and quantified in blood and feces of these animals in an intermittent way, even after the resolution of the lesions. At slaughter, tissues were collected and the viral DNA was detected and quantified from mesenteric and retro mammary lymph nodes, ileum, spleen and liver. The detection of VACV DNA in blood and feces for long period and its detection in lymphatic organs provide new evidence about VACV elimination and suggest, for the first time, that BV could be a persistent systemic infection.

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Simplifying science and technology to clarify and ask the rancher from Rio de Janeiro state everything about rural rabies*

Descomplicando a ciência e a tecnologia para esclarecer e perguntar ao pecuarista fluminense tudo sobre a raiva rural

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Rabies is a contagious disease of great interest to the livestock and public health. The etiologic agent is a neurotropic virus (family *Rhabdoviridae* and genus *Lyssavirus*), which affects the central nervous system. The disease has an anthropozoonotic character, and all mammals may be infected and develop it. Rabies affects domestic herbivores (livestock), and its main transmitter, in rural areas, is the "common vampire bat", *Desmodus rotundus*. This research aimed at education in health and surveillance of rabies, in a simple and playful, to the cattle ranchers of the Northern and Northwestern regions of Rio de Janeiro State, clarifying aspects about rural rabies. The following municipalities/locations were visited: Batatal, Boa Vista, Cardoso Moreira, Caxeta, Dores de Macabu, Espírito Santinho, Hatobá, Italiana, Italva, Pedra Santa, Santa Maria,

São Francisco de Itabapoana and Vila Nova. Both Emater-Rio and Núcleo de Defesa Agropecuária (NDA) of Campos dos Goytacazes, RJ, participated in all visits. A total audience of over 100 farmers, including producers (ranchers) and rural workers (animal handlers), were served. The theme was approached by means of folders, lectures and questionnaires to the target audience. The following data was revealed: 20% of the producers reported suspected cases of rabies on their property, in the last five years; of these, 50% did not send samples for laboratory examination. 74% reported the presence of bats on their property and 75% noticed signs of aggression in animals. Towards the control of bats, 30% of the producers searched for their shelters to exterminate the colonies, 20% were applying the "vampiricid topic" on attacked animals and 60% sought their NDA. Regarding the transmission of rabies, 75% believed that only the vampire bats could do it, 15% believed that human beings may not contract the disease and 70% knew which animals could convey it. In suspected cases of rabies, 60% of the producers contacted the NDA, 35% slaughtered the sick animals and 5% tried to treat them. As regards rabies vaccination, 20% have never used the vaccine and 80% vaccinated their flock; of these, 50% semiannual, 43.3% yearly and 6.2% in the outbreaks. Rural rabies has been emerging due to lack of vaccination and increasing bat attacks. The lack of knowledge and even negligence on the part of producers should be considered. Leading information to the cattle rancher is the best way for prevention and control of rural rabies. As greater as the number of people served, the lower was the losses caused in the livestock economy and the risks to human beings.

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Estimating vulnerability to *foot-and-mouth* disease using stochastic disease simulation in farms and records of movements of animals

Estimando a vulnerabilidade de propriedades à febre aftosa a partir de simulação estocástica de espalhamento de doenças integrado do uso de registros das guias de trânsito animal (GTA)

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Brazil is one of the major producers of beef and one of the main suppliers to the European Union and other countries. Due to major efforts of the Ministry of Agriculture and Livestock, Brazil currently has a zone free of *foot-and-mouth* disease in approximately 60% of the national territory. The zone free of *foot-and-mouth* borders some neighboring countries which do not share an efficient disease surveillance system and, although major efforts are done to mitigate disease entry, it is of interest to investigate more vulnerable routes for diseases. The movement of live animals throughout the Brazilian territory is currently documented in electronic form through the issue of transit animal guides (GTAs). Geographical information about the location of farms, number of transported animals, date of issue of the GTAs, are available in the dataset. From these records, we simulate the spread of foot-and-mouth disease. An infected animal is randomly placed into one of the farms and stochastic models are used to spread the disease among the herd. New farms become contaminated following the entry of infected animals. Movement is represented using a directed network where the farms are represented by vertices (or nodes) and the movements of animals between farms are the edges. To simulate the transmission of disease, three epidemiological stochastic models of SIR (Susceptible-Infected-Recovered) type are used. The simplest model, named farm level, uses the farm as the basic epidemiological unit. The other two models, named Greenwood and Reed-Frost models, simulate the transmission of the disease using the animals within the farms as the basic epidemiological units. The animal level simulation generates the distribution of the daily number of infected farms and the daily number of infected animals during an epidemic cycle. The time period of the simulation is 28 days and the probability of a susceptible animal being infected by an infected animal was set as 0.4. From simulated results, and using network theory, it is possible to estimate the vulnerability of each farm and to identify those trajectories within the network most likely to spread the disease. In the network representation, the vulnerability of a vertex is the proportion of the simulations in which the vertex finishes the simulation period in the infected state. The vulnerability of an edge is the proportion of simulations in which both vertices, connected by the edge, appear simultaneously infected.

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Fatores determinantes da frequência e qualidade das notificações de doenças vesiculares dos ruminantes no Mato Grosso do Sul*

Determinants of the frequency and quality of notifications of vesicular diseases of ruminants in Mato Grosso do Sul, Brazil

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O Mato Grosso do Sul é reconhecido como Estado livre da febre aftosa com vacinação. A manutenção e a credibilidade dessa condição sanitária dependem da existência de um sistema de vigilância eficiente, no qual se inclui a notificação regular de suspeitas de enfermidades vesiculares. No entanto, o número de notificações é muito baixo no Estado, tornando difícil a avaliação da sensibilidade dessa atividade de vigilância. O presente trabalho teve como objetivo identificar fatores que determinam a qualidade e quantidade de notificações de doenças vesiculares no Mato Grosso do Sul, sobretudo aqueles relacionados à percepção dos atores sociais participantes do processo. Inicialmente, realizaram-se 19 entrevistas exploratórias, com perguntas abertas, dirigidas a funcionários de frigoríficos e do Iagro, a funcionários de lojas veterinárias, a propriedades rurais, a assentamentos e a veterinários particulares, as quais foram submetidas à análise lexical pelo software Alceste. A análise lexical revelou que os entrevistados conhecem os sinais clínicos da doença, mas tendem a procurar terceiros antes de notificar algum evento suspeito. A maioria compreende também a rápida difusão e impacto econômico da febre