

Spatial epidemiology of *Leptospira* sp. exposure in bovines from Veracruz, México

Rigo Gutiérrez-Molina¹, Pelayo Acevedo², Sokani Sánchez-Montes³, Dora Romero-Salas¹, Argel Flores Primo¹, and Anabel Cruz-Romero¹

¹Universidad Veracruzana Facultad de Medicina Veterinaria y Zootecnia

²Instituto de Investigacion en Recursos Cinegeticos

³Universidad Veracruzana Facultad de Ciencias Biologicas y Agropecuarias Poza Rica -Tuxpan

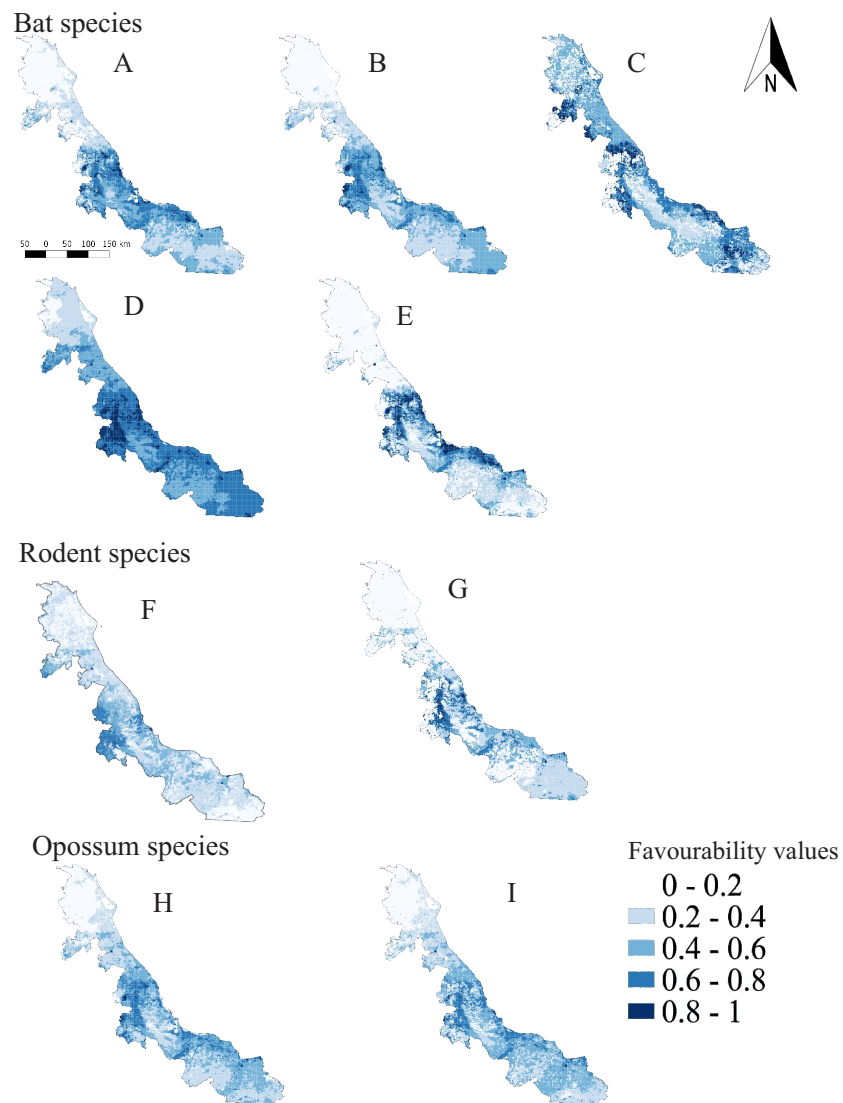
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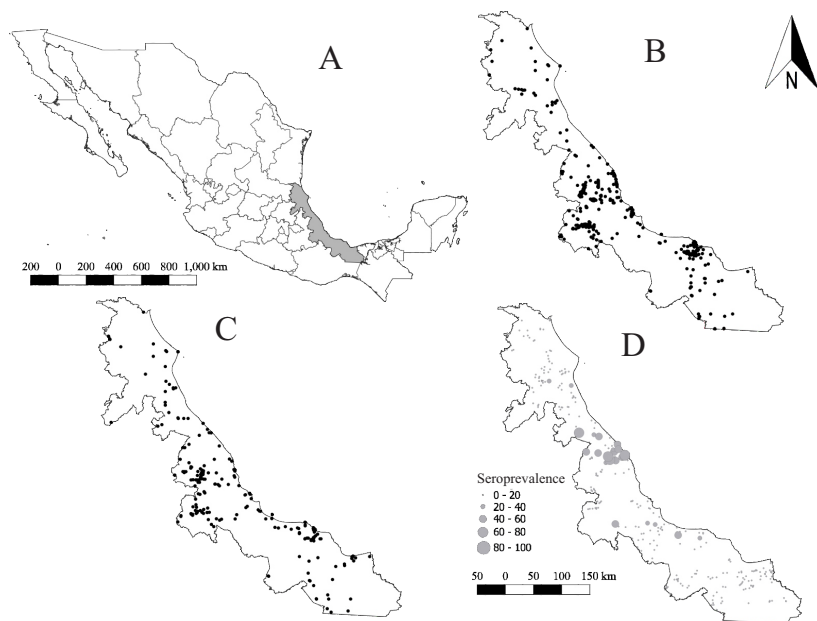
Abstract

Bovine leptospirosis is a bacterial disease that affects cattle herds, causing economic losses due to reproductive problems, which require expensive treatments. The main source of transmission for cattle is still uncertain, but it has been described that rodents and bats can play an important role in the transmission cycle by being maintenance hosts for the pathogenic species of the bacterium and spreading it through urine. In this study, we characterize possible risk areas for bovine leptospirosis exposure in the state of Veracruz, Mexico, based on the geographical distribution of flying (bats) and terrestrial (rodents and opossums) wild hosts of *Leptospira* sp. reported in Mexico in addition with climatic, geographic, soil characteristics, land use and human activities variables (environmental variables). We used a generalized linear regression model (GLM) to understand the association between the frequency of anti- *Leptospira* sp. antibodies (a proxy of exposure to) in cattle herds exposed to *Leptospira*, the favorability of wild hosts of *Leptospira* as well as the environmental variables. The parameterized model explains 12.3% of the variance. The frequency of anti- *Leptospira* sp. antibodies exposure in cattle herds was associated with elevation, geographic longitude, pH of the soil surface and environmental favorability for the presence of rodents, opossums, and bats. The variation in exposure is mainly explained by a longitudinal gradient (6.4% of the variance) and the favorability-based indices for wild hosts (9.6 % of the variance). Describing the possible risks for exposure to *Leptospira* in an important and neglected livestock geographical region, we provide valuable information to the selection of areas for diagnosis and prevention of this relevant disease.

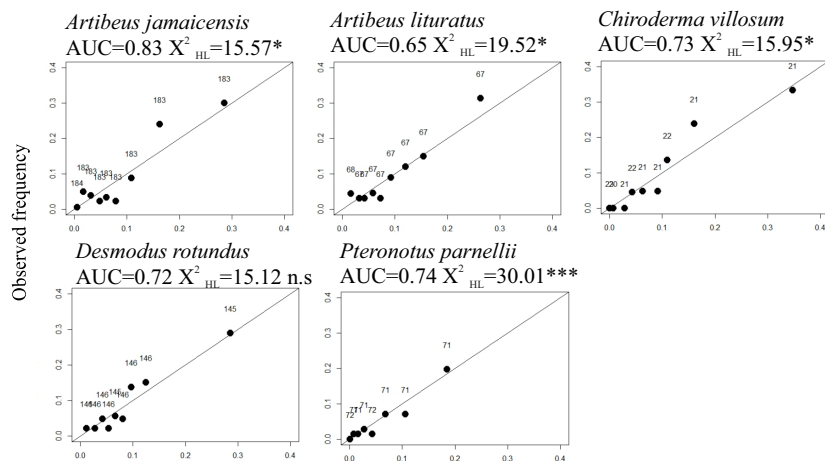
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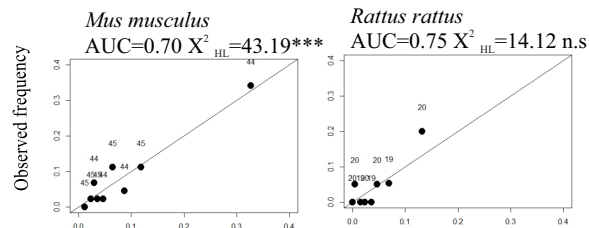




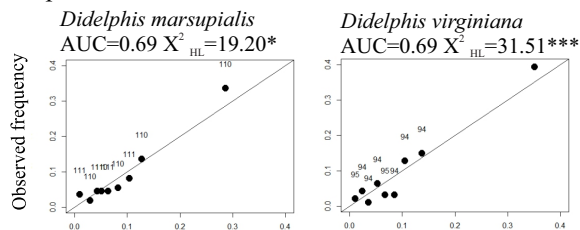
Bats

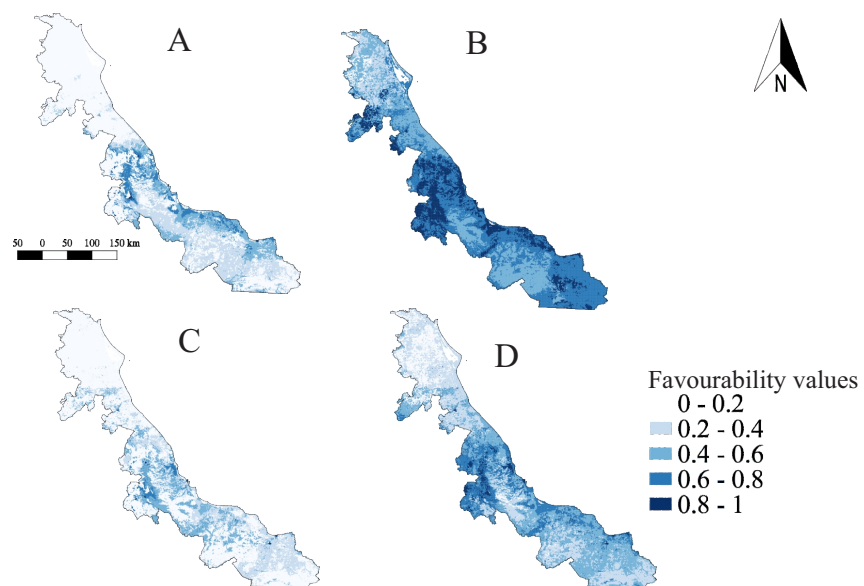


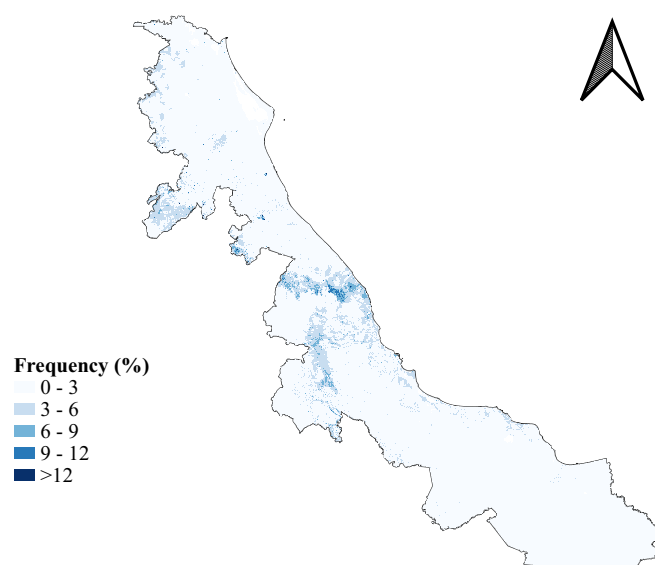
Rodents



Opossums







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