Abstract:

This project examines the spatial epidemiology of the Triatomine bug, an important vector of Chagas disease in Bolivia, which is responsible for more than 12,000 deaths annually. The disease itself is difficult to diagnose, so it is important to control populations of its insect vector. Circuit theory has been previously used to model movement of animal populations across a landscape, and with this tool it may be feasible to conduct a more spatially targeted control campaign against the Triatomine bugs. Based on environmental and genetic data from 13 villages in the Department of Chuquisaca, Bolivia, two least-cost pathway models will be constructed using circuit theory to predict hypothetical movement of the insects across the landscape. For the first model a resistance factor will be assigned to each variable in the landscape. The sum of these weights will be used to construct least-cost pathways. The second model's weights will be based on multivariate regression of genetic distance against the same factors. The two methods of model construction will be compared to determine a best practice of dispersal modeling for future control of this important vector.