



EcoHealthNet 2012 Research Exchange

Project Descriptions

Site 1) Brazil – Zoonotic disease dynamics in a fragmented landscape

Southern Brazil has been the focus of extensive deforestation, with forest converted to cattle ranches and small-scale subsistence agriculture. In other regions, deforestation, with its link to environmental degradation and bushmeat hunting, has led to the emergence of a number of diseases. To investigate this phenomenon in Brazil, we have set up a fragmentation gradient that includes three long term research sites in Brazil. These include extremely degraded sites that make up the forest fragments of the Pontal de Paranapanema, in Southern Brazil, where government efforts to provide settlers with land have brought them into closer connections with remnant wildlife populations. The Pontal do Paranapanema is located in the extreme West of São Paulo State, Brazil. Still mostly covered with Atlantic Forest in the 1950s, today less than 2% is left of a unique ecosystem that is inhabited by rare, endangered and endemic species. Data have been built up that could now be analyzed to begin to test theories on biodiversity and health, and deforestation and disease emergence.

Site 2) Bangladesh – Measuring disease dynamics in wildlife, and their contact with people

Bangladesh has one of the highest population densities in the world, and the connection with remnant biodiversity of wildlife is increasingly pressured. In Bangladesh, we have been collaborating for two years with the ICDDR,B, in Dhaka on the emergence of Nipah virus, which has caused five outbreaks in the country. EcoHealth Alliance has been studying Nipah virus in Malaysia (where it first emerged in 1999, killing more than 100 people) for the last five years under an NIH award. This project is now focused entirely on Nipah virus in Bangladesh. Our work has shown that it emerged from fruit bats, spilling over into pig farms and affecting people who work on these farms. Unlike the Malaysian outbreak, the Bangladesh strain of Nipah virus has moved directly from bats to people, and has set up chains of transmission between people – a critical point in the process of becoming a pandemic. In Bangladesh, we are investigating the interactions of people and bats to assess whether demographic factors are involved in emergence. We are also collecting masses of data from a longterm study of bat Nipah virus serology, with the goal of developing a predictive mathematical model of NiV emergence. This research project site provides a practical way to bring together the human behavioral risk of infection with the wildlife reservoir dynamics affecting risk of spillover.

Site 3) Mexico – Capacity building & conservation of loggerhead turtles in Baja California

Four actions are needed to achieve local capacity building and conservation of sea turtles in Baja California: minimizing incidental mortalities by fishing operations; understanding

Local conservation.
Global health.

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stranding and mortality events; cementing cooperative relationships with stakeholders; and continuing training workshops in the region. This project will reduce and eventually prevent turtle bycatch by working with fishermen, holding professional trainings, and studying sea turtle health in Mexico. Results will help build a regional sea turtle recovery plan and change policy in the region.

Site 4) USA – Socio-economic drivers of pathogens in live animal trade

Members of the DIVERSITAS ecoHEALTH cross-cutting network are working on projects to identify the socio-economic drivers of pathogen spread through live animal trade networks. The group tackles the topic through analyses of large datasets including: U.S. live animal importation data, geographic data on human pathogen hotspots, field research on bait, ornamental aquarium fish trade, and by wedding theoretical approaches from ecology and economics to model pathogen emergence resulting from trade. Student opportunities in summer 2012 may range from survey work to collect industry data targeting perceived risk of disease in trade and incentives to change practices, compilation and database construction of novel economic data on the U.S. pet industry, sample collection to identify pathogens along trade routes or meta-analyses of disease outbreaks resulting from live animal introductions through time. Depending on specific project needs, logistics and student interest, work will be at U. Wyoming, U. Notre Dame, Brown University or EcoHealth Alliance. Ideal applicants should be highly driven and have a demonstrated record of successfully working independently. Applicants should have demonstrated interests in both disease ecology and economics, and experience building and querying large datasets. Students with strong analytical skills should be able to take advantage of project data to develop publishable material.

Site 5) China – Dynamics of avian influenza transmission in a mixed landscape

This EcoHealth Alliance project involves field and laboratory research on bird species in mixed landscapes, which may include farm, semi-urban, and protected areas. Wild and domestic bird populations as well as groups of humans may be able to interact in these environments. Participants for this research exchange will also have the opportunity to interact with a diverse lab group at East China Normal University based in Shanghai, China, take part in research in the field or lab, and potentially edit and write manuscripts.

Site 6) USA – Ecological drivers of West Nile viral transmission

The west suburbs of Chicago have been a focus of West Nile virus transmission since 2002. In this project, a multidisciplinary team is focused on understanding the fine-scale ecological drivers of viral transmission in this urban landscape. The research involves a combination of entomology, ornithology, disease modeling, and molecular epidemiology. Focal areas of participation may include vector biology, avian ecology, geographic information systems, molecular biology, and associated laboratory and statistical analyses, depending on the interests and skills of the applicant.

Site 7) Zambia – Malaria ecology: combined vector ecology and epidemiology

As part of an NIH funded International Centers for Excellence in Malaria Research (ICEMR), this project aims to help characterize the spatial heterogeneity in the risk of malaria in

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southern Zambia. This work involves study related to mosquito vector ecology and human behavior in a rural region of southern Africa.

Site 8) Brazil – Genetic and ecological factors for dengue virus transmission and disease severity

The work currently being done at the Fiocruz-Recife field site is focused on how the genetic of the virus, vector and host influences the dynamics of the transmission of the virus and the severity of the disease. The research group from the University of Pittsburgh measures the vector and human host innate responses against dengue virus and genotype a few innate immune responses genes and will investigate associations among virus, vector or host genotypes with the levels of anti-viral responses, "incidence" of dengue infected mosquitoes and severity of disease.

Site 9) USA – Predicting global hotspots: Updating the human emergence infectious disease events database

Emerging infectious diseases (EIDs) are a key threat to global public health. At EcoHealth Alliance, we have developed a multi-staged approach to predict and forecast the emergence of new pathogens. Our approach is based on the understanding that EIDs emerge due to socioeconomic and environmental changes, and that these, together with host and pathogen traits, shape the geographic patterns for future EID risk. We have developed a unique global database of the geographical and temporal origins, and biological traits, of all 500+ pathogens to emerge in humans since 1940 to 2008. Based on an extensive literature review, the objective of this internship is to update the human emergence infectious disease events since 2008, which will be used to improve the EIDs hotspots model. This internship will closely work with another EcoHealth Alliance project called Sickipedia.

Site 10) USA – Disease ecology pilot projects based in New York, NY

EcoHealth Alliance is developing several pilot projects, to be based at offices in New York City, which may involve fieldwork with animals, use of mathematical modeling for infectious diseases, lab screening of wildlife samples, and/or creating new databases. This may be a great new opportunity for individuals who have a background in mammal sampling, in using GIS or computer programming (e.g. R), in pathogen discovery, or in creating databases from literature searches.